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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Patent Application of

Peter Mardilovich et al.

Application No. 10/629,116

Filed: July 28, 2003

For: Fuel Cell Support Structure and Method of Manufacture

Group Art Unit: 1795

Examiner: LEE, Cynthia K.

Confirmation No.: 5931

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to Appellants' filing of an Appeal Brief on 26 April 2007, the Examiner of this application reopened prosecution with a non-final Office Action dated 11 July 2007. Appellant again attempted to receive a hearing on appeal by filing a reinstated Appeal Brief on 3 December 2007. However, the Examiner has once again reopened prosecution with a non-final Action dated 25 February 2008 (the "Office Action" or the "Action"). Having reviewed the new grounds of rejection raised in the latest Office Action, Appellants again request reinstatement of the appeal in this application and files the present, updated Appeal Brief, along with a new Notice of Appeal, in support of the re-instated appeal.

I. Real Party in Interest

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. Related Appeals and Interferences

There are no appeals or interferences related to the present application of which the Appellants are aware.

III. Status of Claims

Claims 1-48 have been cancelled. Claims 49-84 are pending in the application and stand finally rejected. Accordingly, Appellants appeal from the final rejection of claims 49-84, which claims are presented in the Appendix.

IV. Status of Amendments

No amendments have been filed subsequent to the final Office Action of 15 December 2006 or the latest non-final Office Action dated 25 February 2008, from which Appellants take this appeal.

V. Summary of Claimed Subject Matter

Fuel cells conduct an electrochemical reaction with reactants such as hydrogen and oxygen to produce electricity and heat. (*Appellants' specification, paragraph 0001*). A typical fuel cell includes an electrolyte disposed between an anode and a cathode. (*Appellants' specification, paragraph 0002*). Appellants' specification describes a fuel cell support structure for the anode, cathode and electrolyte, and methods for fabricating fuel cell support structures. According to one exemplary implementation, a fuel cell support structure includes a self-organized ceramic substrate in which nanopores of selected morphology are defined. (*Appellants' specification, paragraph 0024*).

With reference to Appellants' Fig. 1, a fuel cell (100) generally includes a support structure (110), an electrolyte (120), an anode (130), and a cathode (140). The fuel cell support structure (110) supports the electrolyte (120), the anode (130), and/or the cathode (140). Fig. 1 illustrates an exemplary implementation of a dual chamber fuel cell (100) utilizing a self-organized nanoporous ceramic fuel cell support structure (110). As used herein, the term "self-organized" refers to the property of the material from which the support structure is made to form parallel nanopores when the support substrate is grown, micromachined or etched as described below. The support structure may be formed, for example, from anodic alumina. In the illustrated implementation, a dense layer of electrolyte (120) is disposed in the pores (150) in the support structure (110). Further, the anode (130) and the cathode (140) are disposed on opposing sides of the support structure (110), being separated by the support structure (110) and the deposited electrolyte (120). Thus, the combination of the support structure, the electrolyte (120), the anode (130) and the cathode (140) separate the two chambers of the fuel cell system (not shown). The structure and operation of the dual chamber fuel cell will be described in more detail below with reference

to Figs. 9-11. For dual chamber systems, efficiency may be affected by the need to seal two chambers from each other and by the ability to transfer ions from the cathode across the electrolyte to the anode. Precise control of the porosity characteristics of a support structure may allow for more precise formation of the electrolyte and/or electrodes on the support structure while providing for improved diffusion. (*Appellants' specification, paragraph 026*)

Turning to specific claims:

Claim 49 recites:

A fuel cell comprising:

a ceramic support substrate (110) supporting a cathode (140), anode (130) and electrolyte (120) (*Appellants' specification, paragraph 026*); and

a plurality of pores (150) formed through said substrate (110), said pores (150) having a size that varies in diameter through a thickness of said substrate (110) (*Appellants' specification, paragraph 0036 and Figs. 6 and 7*).

Claim 51 recites:

A fuel cell comprising:

a support substrate (110) supporting a cathode (140), anode (130) and electrolyte (120) (*Appellants' specification, paragraph 026*); and

a plurality of pores (150) formed through said substrate (110) (*Appellants' specification, paragraph 026*),

wherein said pores (150) vary in diameter by tapering to a narrow point (600) between two openings, both openings being larger than said narrow point (*Appellants' specification, paragraph 0036 and Figs. 6 and 7*).

Claim 58 recites:

An apparatus comprising:

a fuel cell configured for providing power (*Appellants' specification, paragraph 026*), said fuel cell comprising:

a support substrate (110) supporting a solid cathode material (140) deposited on a first side of said substrate (110), a solid anode material (130) deposited on a second side of said substrate (110) and an electrolyte (120) (*Appellants' specification, paragraph 026*); and

a plurality of pores (150) formed through said substrate (110), said pores (150) having a size and shape formed in accordance with a pre-selected desired porosity (*Appellants' specification, paragraph 026*).

VI. Grounds of Rejection to be Reviewed on Appeal

The recent Office Action raised the following grounds of rejection:

(1) Claim 51, 60-64, 67, 77 and 78 were rejected under 35 U.S.C. § 112, first paragraph, as lacking a supporting written description in the specification.

(2) Claims 55 and 57 (actually 58) were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

(3) Claims 49, 50, 56, 58, 59, 65 and 66 were rejected as anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 3,503,808 to Agruss ("Agruss").

(4) Claims 49, 50-52, 55, 56, 58-61, 64, 70-72, 74, 75, 77-81, 83 and 84 were rejected as anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 5,234,722 to Ito ("Ito").

(5) Claims 58, 60-62, 64 and 67 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,482,792 to Faita ("Faita").

(6) Claim 76 was rejected as being unpatentable under 35 U.S.C. § 103(a) over the teachings of Ito in view of Hibino (of record).

(7) Claim 73 was rejected as being unpatentable under 35 U.S.C. § 103(a) over the teachings of Ito in view of U.S. Patent No. 6,558,831 to Doshi ("Doshi").

(8) Claim 82 was rejected as being unpatentable under 35 U.S.C. § 103(a0 over the teachings of Ito in view of Doshi.

(9) Claims 49, 51-53, 55 and 57 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Faita and U.S. Patent No. 7, 018,734 to Haluzak ("Haluzak").

Accordingly, Appellants hereby request review of these grounds of rejection.

VII. Argument

(1) Claims 51, 60-64, 67, 77 and 78 complies with 35 U.S.C. § 112:

The most recent Office Action rejects claims 51, 60-64, 67, 77 and 78 on the contention that the specification does not enable these claims. Appellant respectfully disagrees.

Claim 51 recites:

> A fuel cell comprising:
> a support substrate supporting a cathode, anode and electrolyte; and
> a plurality of pores formed through said substrate,
> wherein said pores vary in diameter by tapering to a narrow point between two openings, both openings being larger than said narrow point.

In support of claim 51, an exemplary process of forming "a support substrate" with a plurality of pores is given in Appellant's specification at, for example, paragraph 0029 and is illustrated in Fig. 4. The resulting pores vary in diameter by tapering to a narrow point between two openings, both openings being larger than said narrow point, as recited in claim 51. The substrate and pores are illustrated in Fig. 6. The further process of forming the claimed fuel cell from such a substrate is illustrated in Fig. 8 and described in the corresponding paragraphs of the specification.

The Office Action does not appear to question that this and other portions of Appellant's specification adequately teach one of skill in the art to make and use the claimed fuel cell as recited in claim 51. This would seem to enable claim 51.

The particular example given in Appellant's specification describes forming the claimed support substrate from a ceramic material. Focusing on this example, the recent Office Action complains that Appellant has not described a process for forming the claimed support substrate from every other possible material. (Action, p. 3). Appellant respectfully submits that it is completely unreasonable to require Appellant to describe a process for

producing a claimed device from every possible material before that device can be claimed. For example, taken to its extreme, the position of the latest Office Action would dictate that Appellant describe how to make a desired fuel cell substrate from cheese, bacon and lettuce before Appellant can claim the substrate. This is clearly unreasonable. Appellant has claimed a fuel cell comprising a particular porous substrate and has provided a detailed explanation of how to form such a substrate. Nothing more should be required.

Attempting to further the point, the Office Action holds that "undue experimentation would be required to determine what other compounds other than those disclosed by applicant can be used to make and practice applicant's invention as claimed." (Action, p. 4). However, the Action provides absolutely no evidence or reasoning in support of this conclusion. The Action appears to forget that all inquires are taken from the perspective of those skilled in the art who, by definition, know that they're doing. Appellant respectfully submits that one of skill in the art, with the benefit of Appellant's disclosure, would readily appreciate how and with what materials the claimed fuel cell may be practiced. The Examiner provides no reason to conclude otherwise.

Appellant notes that, under applicable case law, the test for enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. *In re Angstadt*, 537 F.2d 498, 190 USPQ 214 (CCPA 1976). The burden is initially upon the examiner to establish a reasonable basis for questioning the sufficiency of the disclosure. *In re Strahilevitz*, 668 F. 2d 1229, 212 USPQ 561 (CCPA 1982). If the examiner has a reasonable basis for questioning the sufficiency of the disclosure, the burden shifts to the applicant to come forward with evidence to rebut his challenge. *In re Ghiron*, 442 F.2d 985, 169 USPQ 723 (CCPA 1971). In the present case, as noted above, the Examiner has not

provided any reasonable basis for questioning the sufficiency of the disclosure under 35 U.S.C. § 112, first paragraph.

For at least these reasons, the rejection of claims 51, 60-64, 67, 77 and 78 should not be sustained.

(2) Claims 55 and 58 comply with 35 U.S.C. § 112, second paragraph:

In this regard, the latest Office Action states that claims 55 and 57 were rejected under § 112. However, the Action provides no discussion of claim 57, referring instead to claim 58. Consequently, Appellant must presume that the Examiner intended to reject claim 58 and not claim 57 under this heading.

Claim 55:

The recent Office Action argues that "claim 55 contracts [contradicts?] claim 49 from which it depends. It is unclear as to how pores that vary in diameter through a thickness of said substrate (claim 49) can be also 'substantially uniform in size and shape' (claim 55)." (Action , p. 6). Appellant respectfully disagrees.

Starting again with the perspective of one skilled in the art, claim 55 clearly refers to the desired characteristic that each pore of the plurality of pores is substantially the same, i.e., uniform, in size and shape as the other pores. Each of the uniform pores varies in diameter through the thickness of the substrate, as claimed. This is illustrated in each of the figures in Appellant's specification that show the plurality of pores. Consequently, there is no lack of clarity in claim 55 as erroneously alleged in the Action. For at least these reasons, the rejection of claim 55 under § 112 should not be sustained.

Claim 58:

Claim 58 recites:

> An apparatus comprising:
> a fuel cell configured for providing power, said fuel cell comprising:
> a support substrate supporting a solid cathode material deposited on a first side of said substrate, a solid anode material deposited on a second side of said substrate and an electrolyte; and
> a plurality of pores formed through said substrate, said pores having a size and shape formed in accordance with a pre-selected desired porosity.

According to the recent Office Action, "[i]t is unclear to the Examiner as to what constitutes 'pre-selected desired' porosity." (Office Action, p. 7). Appellants respectfully submit that no actual basis for rejecting claim 58 under 35 U.S.C. § 112 is given in this statement.

There is no reason why the "pre-selected desired porosity should be unclear. Appellants' specification clearly explains the concept of a "pre-selected desired porosity."

> The fabrication process may begin with determining the desired initial porosity characteristics of the supports structure (step 400). Average pore diameter varies with the anodization voltage used during the formation of anodic alumina. In addition, other factors such as the nature of the anodization electrolyte, electrolyte concentration, and tempore of the anodization may affect the pore diameter. Accordingly, a larger anodization voltage may be applied to the aluminum substrate where a larger average pore size is desired. Further, during formation porosity characteristics can be varied as the substrate is grown, thereby allowing for establishment of pore morphology including a plurality of pore sizes and for change in pore size with respect to the direction of substrate growth. Thus once the desired pore morphology has been determined (step 400), it may be necessary to calculate the anodization voltage profile necessary for the process to achieve the desired pore morphology (step 410).

(Appellants' specification , paragraph 0029).

Consequently, despite being unclear to the Examiner, claim 58 is not indefinite and is clearly explained and supported in Appellants' specification. Therefore, the rejection of claim 58 under 35 U.S.C. § 112, second paragraph, should not be sustained.

(3) Claims 49, 50, 56, 58, 59, 65 and 66 are Patentable over Agruss:

Claim 49:

Claim 49 recites:

> A fuel cell comprising:
> a ceramic support substrate supporting a cathode, anode and electrolyte; and
> a plurality of pores formed through said substrate, *said pores having a size that varies in diameter through a thickness of said substrate.*

(Emphasis added).

In contrast, to claim 49, Agruss does not teach or suggest a fuel cell comprising a porous substrate, "said pores having a size that varies in diameter through a thickness of said substrate." There is no teaching or suggestion in Agruss of this feature of claim 49.

It is incumbent upon the Examiner to identify where in the reference each element may be found. *Ex parte Levy*, 17 U.S.P.Q.2d 1461 (BPAI 1990). Consequently, when the Examiner fails to identify a claimed element, the Examiner has failed to establish a prima facie case of anticipation.

Accordingly, the latest Office Action is unable to cite to any teaching or suggestion in Agruss of the claimed fuel cell comprising a porous substrate, "said pores having a size that varies in diameter through a thickness of said substrate." Rather, the latest Office Action merely alleges that Agruss teaches this subject matter with any supporting evidence or citation to the teachings of Agruss. (Aciton, p. 8).

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, this rejection of claim 49 should not be sustained.

Claim 58:

Claim 58 recites:

> An apparatus comprising:
> a fuel cell configured for providing power, said fuel cell comprising:
> a support substrate supporting *a solid cathode material* deposited on a first side of said substrate, *a solid anode material* deposited on a second side of said substrate and an electrolyte; and
> a plurality of pores formed through said substrate, said pores having a size and shape formed in accordance with a pre-selected desired porosity.

(Emphasis added).

In contrast, Agruss fails to teach or suggest the claimed porous substrate supporting a *solid* cathode material and a *solid* anode material. In this regard, reference is made to Appellants' originally-filed specification at, for example, paragraph 0039.

To the contrary, Agruss teaches away from this subject matter with a very different fuel cell chemistry in which the electrodes are *liquid*. (Agruss, col. 2, lines 25-30). Clearly, one of skill in the art can tell the difference between a solid electrode material, as claimed, and a liquid electrode material, as taught by Agruss.

Agruss teaches ***solutions*** which are clearly liquid, even at room temperature, and which merely contain, in solution, potassium and thallium. "A liquid potassium rich ***solution*** of potassium and thallium in the upper chamber 10 forms a negative electrode while a thallium rich ***solution*** of liquid potassium and thallium in the lower chamber 12 forms a positive electrode." (Agruss, col. 2, lines 25-30) (emphasis added). Consequently, it is utterly unreasonable, as the Office Action has attempted, to suggest that the liquid electrodes taught by Agruss are somehow solid despite the clear statements of Agruss to the contrary.

Agruss fails to teach or suggest the claimed porous substrate supporting a *solid* cathode material and a *solid* anode material. "A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently

described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, the rejection of claims 58 and 59 should not be sustained.

(4) Claims 49, 50-52, 55, 56, 58-61, 64, 70-72, 74, 75, 77-81, 83 and 84 are patentable over Ito:

Claim 49:

Claim 49 recites:

> A fuel cell comprising:
> a ceramic support substrate supporting a cathode, anode and electrolyte; and
> a plurality of pores formed through said substrate, *said pores having a size that varies in diameter through a thickness of said substrate*.

(Emphasis added).

In contrast, Ito does not teach or suggest this subject matter. Ito does not teach or suggest a ceramic support substrate with pores formed through the substrate having a size that varies in diameter through the thickness of the substrate.

Moreover, the recent Office Action fails to adequately explain how or where Ito teaches such subject matter. (Action, p. 8). To the contrary, the recent Office Action completely misunderstands and misconstrues the teachings of Ito. In reality, Ito teaches away from a porous substrate like that claimed. Rather, Ito teaches a "solid electrolyte film [that] has a true porosity of not more than 5%." (Ito, abstract).

With this background, Ito states that "FIGS. 1 and 2 are scanning type electromicroscopic photographs showing the structure of the solid electrolyte films." (Ito, col. 3, lines 60-64). Thus, as would thus be clear to one of skill in the art, Figs. 1 and 2 show the various structural components of the solid films, both a film material and a stabilizing

material. Figs. 1 and 2 *do not* show pores in the "solid" film as mistakenly assumed by the Examiner.

According to the Action, "the pores are not completely spherical in shape. See fig. 1 and 2. Thus, it is noted that the pores vary in diameter ... in the thickness direction." (Action, p. 9). As demonstrated above, however, there is nothing in Ito that would lead one to conclude that Figs. 1 and 2 are illustrating pore shapes, quite the contrary. Thus, the Examiner is again trying to read teachings into Ito that simply are not there.

Clearly, there is no reasonable basis on the record for reading into Ito the subject matter of claim 49, as the Office Action attempts to do. "A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, this rejection of claim 49 should not be sustained.

Claim 51:

Claim 51 recites:

> A fuel cell comprising:
> a support substrate supporting a cathode, anode and electrolyte; and
> a plurality of pores formed through said substrate,
> wherein *said pores vary in diameter by tapering to a narrow point between two openings, both openings being larger than said narrow point.*

(Emphasis added).

With regard to claim 51, the Action argues that Ito teaches "pores [that] vary in diameter by tapering to a narrow point between two openings both openings being larger than said narrow point. Refer to a portion of fig. 1 below." (Action, p. 9). Appellant has two

responses. First, as demonstrated above, Fig. 1 of Ito does not show pores as erroneously presumed by the Examiner. Second, even if Fig. 1 did show pores, Fig. 1 absolutely does not illustrate the claimed pore shape with two *openings* and tapering to a narrow point between such openings.

The Examiner is again trying to read teachings into Ito that simply are not there. Clearly, there is no reasonable basis on the record for reading into Ito the subject matter of claim 51, as the Office Action attempts to do. "A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, this rejection of claim 51 should not be sustained.

Claim 58:

Claim 58 recites:

> An apparatus comprising:
> a fuel cell configured for providing power, said fuel cell comprising:
> a support substrate supporting a solid cathode material deposited on a first side of said substrate, a solid anode material deposited on a second side of said substrate and an electrolyte; and
> a plurality of pores formed through said substrate, *said pores having a size and shape formed in accordance with a pre-selected desired porosity*.

(Emphasis added).

The latest Office Action neglects to specifically address claim 58 under the rejection based on Ito and, thus, utterly fails to indicate how or where Ito teaches the subject matter of claim 58.

It is incumbent upon the Examiner to identify where in the reference each element may be found. *Ex parte Levy*, 17 U.S.P.Q.2d 1461 (BPAI 1990). Consequently, when the

Examiner fails to identify a claimed element, the Examiner has failed to establish a prima facie case of anticipation.

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, this rejection of claim 58 should not be sustained.

(5) Claims 58, 60-62, 64 and 67 are patentable over Faita:

Claim 58:

Claim 58 recites:

> An apparatus comprising:
> a fuel cell configured for providing power, said fuel cell comprising:
> a support substrate supporting a solid cathode material deposited on a first side of said substrate, a solid anode material deposited on a second side of said substrate and an electrolyte; and
> a plurality of pores formed through said substrate, *said pores having a size and shape formed in accordance with a pre-selected desired porosity.*

(Emphasis added).

In contrast, Faita utterly fails to teach or suggest this subject matter. According to the misguided Office Action, Faita "discloses [a] plurality of pores 2 or 9) and 3 (or 11) (fig. 2 and 3) formed through the bipolar plate or the gasket. These pores taper to a narrow point between the openings." (Action, p. 10). This is a complete misreading of what Faita teaches.

According to Faita, "the bipolar plate (1) is made of a metal plate which may have a flat surface in the area of contact with the collector (14). The peripheral frame area of the bipolar plate (1) is provided with holes (2) and optionally with distribution channels (3) for the inlet and outlet of the gasses." (Faita, col. 5, lines 53-58). Thus, Faita teaches a bipolar

plate at the outside of an electrochemical cell (See Fig. 1) with holes for admitting gases to the enclosed electrochemical cell.

Consequently, the bipolar plate (1) of Faita to which the Action refers is clearly not "a support substrate supporting *a solid cathode material deposited on a first side of said substrate, a solid anode material deposited on a second side of said substrate* and an electrolyte," as recited in claim 58. (Emphasis added). The Action fails to point to any such substrate in the teachings of Faita that also includes the plurality of pores as claimed. Moreover, one of skill in the art would never confuse the gas pathway holes in a metal plate taught by Faita with the claimed pores having a size and shape formed in accordance with a pre-selected desired porosity, as recited in claim 58.

Thus, Faita clearly fails to teach or suggest the subject matter of claim 58. "A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). See M.P.E.P. § 2131. Therefore, for at least the reasons explained here, the rejection based on Faita of claim 58 and its dependent claims should be reconsidered and withdrawn.

(6) Claim 76 is patentable over Ito and Hibino:

This rejection is respectfully traversed for at least the same reasons given above in favor of independent claim 58. Therefore, this rejection of claim 76 should not be sustained.

(7) Claim 73 is patentable over Ito and Doshi:

This rejection is respectfully traversed for at least the same reasons given above in favor of independent claim 49. Therefore, this rejection of claim 73 should not be sustained.

(8) Claim 82 is patentable over Ito and Doshi:

This rejection is respectfully traversed for at least the same reasons given above in favor of independent claim 58. Therefore, this rejection of claim 82 should not be sustained.

(9) Claims 49, 51-53, 55 and 57 are patentable over Fajta and Haluzak:

This rejection fails under 35 U.S.C. § 103(c). 35 U.S.C. § 103(c) states:

> Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Appellant notes that Haluzak is available as prior art against the present application only under 35 U.S.C. § 102(e). The present application was filed July 28, 2003. The Haluzak patent was issued much later on March 28, 2006. Consequently, the Examiner must rely on the filing date of Haluzak under § 102(e).

Appellant also notes that Haluzak is assigned to the Hewlett-Packard Development Co. LP. Similarly, the present application is also assigned to Hewlett-Packard Development Co. LP (*See*, recorded assignment at reel/frame 014279/01980200). Applicant hereby states that the subject matter of the present application and the Haluzak reference were, at the time the invention of the present application was made, owned by, or subject to an obligation of assignment to, the same person, i.e., Hewlett-Packard Development Co. LP (*See* MPEP § 706.02(l)(2)).

Consequently, under 35 U.S.C. § 103(c), the Haluzak reference *cannot* be applied as prior art against the present application under 35 U.S.C. § 103(a). Therefore, the listed rejection applying Haluzak under § 103(a) cannot be sustained.

In view of the foregoing, it is submitted that the final rejection of the pending claims is improper and should not be sustained. Therefore, a reversal of the Rejection of July 11, 2007 is respectfully requested.

Respectfully submitted,

DATE: May 23, 2008

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CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being transmitted to the Patent and Trademark Office facsimile number 571-273-8300 on May 23, 2008. Number of Pages: 34

Rebecca R. Schow

VIII. CLAIMS APPENDIX

1-48. (cancelled)

49. (previously presented) A fuel cell comprising:

a ceramic support substrate supporting a cathode, anode and electrolyte; and

a plurality of pores formed through said substrate, said pores having a size that varies in diameter through a thickness of said substrate.

50. (original) The fuel cell of claim 49, wherein said electrolyte is deposited in said pores.

51. (previously presented) A fuel cell comprising:

a support substrate supporting a cathode, anode and electrolyte; and

a plurality of pores formed through said substrate,

wherein said pores vary in diameter by tapering to a narrow point between two openings, both openings being larger than said narrow point.

52. (original) The fuel cell of claim 49, wherein said pores branch within said substrate.

53. (previously presented) The fuel cell of claim 52, wherein branching of said pores results in a greater number of pore openings on a first side of said substrate than on a second side of said substrate.

54. (original) The fuel cell of claim 53, wherein said anode is disposed on said first side of said substrate and said cathode is disposed on said second side of said substrate.

55. (previously presented) The fuel cell of claim 49, wherein said pores are substantially uniform in size and shape.

56. (original) The fuel cell of claim 49, wherein said substrate comprises alumina.

57. (previously presented) The fuel cell of claim 55, wherein said substrate comprises a second plurality of substantially uniform pores formed through said substrate wherein an average size of said second plurality of pores is smaller than said first plurality of pores.

58. (previously presented) An apparatus comprising:

a fuel cell configured for providing power, said fuel cell comprising:

a support substrate supporting a solid cathode material deposited on a first side of said substrate, a solid anode material deposited on a second side of said substrate and an electrolyte; and

a plurality of pores formed through said substrate, said pores having a size and shape formed in accordance with a pre-selected desired porosity.

59. (original) The apparatus of claim 58, wherein said electrolyte is deposited in said pores.

60. (original) The apparatus of claim 58, wherein said pores vary in diameter along a thickness of said substrate.

61. (original) The apparatus of claim 58, wherein said pores branch within said substrate.

62. (original) The apparatus of claim 61, wherein branching of said pores results in a greater number of pore openings on a first side of said substrate than on a second side of said substrate.

63. (original) The apparatus of claim 62, wherein said anode is disposed on said first side of said substrate and said cathode is disposed on said second side of said substrate.

64. (original) The apparatus of claim 58, wherein said pores are formed in parallel through said substrate.

65. (original) The apparatus of claim 58, wherein said substrate comprises a ceramic.

66. (original) The apparatus of claim 58, wherein said substrate comprises alumina.

67. (original) The apparatus of claim 58, wherein said substrate comprises a second plurality of pores formed through said substrate wherein an average size of said second plurality of pores is smaller than said first plurality of pores.

68. (previously presented) The fuel cell of claim 49, wherein said pores provide an open passageway through said substrate with said electrolyte being deposited on sides of interiors of said pores.

69. (previously presented) The fuel cell of claim 68, wherein each pore comprises a layer in which said electrolyte is mixed with a material of said substrate, said layer being between said electrolyte said substrate.

70. (previously presented) The fuel cell of claim 49, wherein said cathode comprises perovskite.

71. (previously presented) The fuel cell of claim 70, wherein said cathode comprises lanthanum manganite.

72. (previously presented) The fuel cell of claim 49, wherein said anode comprises a ceramic/metal composite.

73. (previously presented) The fuel cell of claim 72, wherein said anode comprises nickel and yttria-stabilized zirconia cermet.

74. (previously presented) The fuel cell of claim 49, wherein said electrolyte comprises at a zirconia-based electrolyte.

75. (previously presented) The fuel cell of claim 74, wherein said electrolyte comprises at least one of yttria-stabilized zirconia, gadolinium-doped ceria, $Ba_2In_2O_5$, or a (strontium, magnesium)-doped $LaGaO_3$ (LSGM).

76. (previously presented) The apparatus of claim 58, wherein said fuel-cell is a single chamber fuel cell.

77. (previously presented) The apparatus of claim 58, wherein said pores provide an open passageway through said substrate with said electrolyte being deposited on sides of interiors of said pores.

78. (previously presented) The apparatus of claim 77, wherein each pore comprises a layer in which said electrolyte is mixed with a material of said substrate, said layer being between said electrolyte said substrate.

79. (previously presented) The apparatus of claim 58, wherein said cathode comprises perovskite.

80. (previously presented) The apparatus of claim 79, wherein said cathode comprises lanthanum manganite.

81. (previously presented) The apparatus of claim 58, wherein said anode comprises a ceramic/metal composite.

82. (previously presented) The apparatus of claim 81, wherein said anode comprises nickel and yttria-stabilized zirconia cermet.

83. (previously presented) The apparatus of claim 58, wherein said electrolyte comprises at a zirconia-based electrolyte.

84. (previously presented) The apparatus of claim 83, wherein said electrolyte comprises at least one of yttria-stabilized zirconia, gadolinium-doped ceria, $Ba_2In_2O_5$, or a (strontium, magnesium)-doped $LaGaO_3$ (LSGM).

IX. Evidence Appendix

None

X. Related Proceedings Appendix

None

XI. Certificate of Service

None